N. F. Smith Watershed Analysis Update

June
2004

As a result of the Biscuit Fire 2002, conditions have changed since the 1997 N.F. Smith River Watershed Analysis was completed. This document tiers to the 1997 N.F. Smith Watershed Analysis and updates the sections that have changed as a result of the fire.

Updated Sections include:

Aquatics
Wildlife
Vegetation
Insect
Transportation
POC

M. Mchugh- Geology
C. Park – Hydrology
D. Delany - Fish
R.Miller – Wildlife
N. Vagle - Vegetation
D. Goheen - Insect
C. Kaping – Transportation
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Aquatics

Changes in Current Conditions

No. Fork Smith River Watershed Vegetation Changes [a]							
		Changes in Vegetation from Biscuit Fire					
Total Acres	Acres outside of Fire perimeter	Change Class[1]				Channel Instability[2]	A
		1	2	3	4		
101098	51067	7611	14012	19802	8606	9.3	

[a] *As noted in the Biscuit Recovery DEIS and Biscuit Post-Fire Assessment*

1. Class 1: Very little burn or under burn
   Class 2: Majority of vegetation burned; needles retained
   Class 3: All vegetation burned; needles retained
   Class 4: All vegetation burned; no needles retained

2. Acres of channel showing streambank instability; identified from post-fire aerial photo review.
3. Acres of fireline constructed with bulldozers.

The 1995 Watershed Analysis and this update refer only to those portions of the drainage within the State of Oregon. North Fork Smith River, and its major tributaries such as Baldface and Diamond Creeks, all carry a naturally high sediment load that is contributed by large, naturally occurring landslides. The majority of the slides are inner gorge failures, which result from a combination of poorly resistant bedrock (ultramafic/serpentinite rock types), tectonic stresses (fracturing and faulting), and on-going tectonic uplift. This combination is common to much of the west side of the Siskiyou Forest, but is more dramatically expressed in the deeply incised drainages within the Kalmiopsis Wilderness. (Other significant occurrences include the gorge area of Hunter Creek). Inner gorge failures, debris and rockslides, and debris flows on the face slopes are almost ubiquitous in occurrence and at a scale that is generally much larger than any other landslides of these types on the Forest. Lower gradient stream channels always appear aggraded. Baldface Creek has a significant number of these large, inner gorge failures. Age and activity level of the failures ranges from ancient to currently active. Many of the failures are within the ultramafic rock types, and are often concentrated in number close to faulted contacts with other rock types. Wildfire can affect slope stability through a loss of root strength, but also by an increase in stream flow (undercutting the toe), or increase in water table (loss of vegetative transpiration). Aerial photo and reviews were conducted as part of the Biscuit Assessment to assess potential changes in surface erosion or landslide rates. As part of the Assessment a very cursory review of active landslides along perennial streams was done to help identify landslide scarps that would be most susceptible to surface ravel and sloughing, and shallow debris failures, thus increasing potential for delivery of sediment to streams. A more detailed aerial photo inventory was completed for the EIS, but did not include much of the Kalmiopsis Wilderness. Although no failures appeared to have occurred since the Biscuit Fire, scarps of existing slides all appear to be actively sloughing. Approximately 11 acres of active unstable landforms were mapped from post-fire aerial photos, although when the Wilderness is mapped, this number may increase.

Channels showing streambank instability were also identified and mapped for the Assessment, but did not include mapping the Wilderness since the purpose of the project was to identify potential areas for riparian planting.

The area reviewed for this analysis is underlain by ultramafic rock types against a faulted contact with Jurassic-aged Dothan metasedimentary and metavolcanic rocks. Soils developed from ultramafic rocks typically have sparse vegetation cover because of nutrient-poor soil chemistry. Soils are generally shallow, gravelly, and tend to be droughty with high porosity but poor permeability. Contacts are easily identified by the contrast in vegetation cover and diversity, the reddish color of the ultramafic soils, and topography. Geomorphically, the underlying lithology can be differentiated by contrasting the more subdued topography of the ultramafic rocks with the steep, rocky peaks and ridges created by more resistant Dothan rock types. Vegetation on ultramafic lithology appears to have been more extensively and intensively burned by the Biscuit Fire; fire return intervals in serpentine areas are commonly more frequent than for other rock types.

Hydrology

Water temperatures affect all aquatic biota and are a critical factor in maintaining and restoring healthy salmonid populations. The DEQ has established temperature criteria to protect temperature-sensitive, beneficial uses, including specific salmonid life cycle stages. The DEQ policy states "to protect aquatic ecosystems from adverse warming and cooling caused by anthropogenic activities. The Commission intends to minimize the risk to cold-water aquatic ecosystems from anthropogenic warming, to encourage the restoration and protection of critical aquatic habitat, and to control extremes in temperature fluxuations due to anthropogenic activities. The Commission recognizes that some of the State's waters will, in their natural condition, not provide optimal thermal conditions at all places and at all times that salmonid use occurs. Therefore, it is especially important to minimize additional warming due to anthropogenic sources. In addition, the Commission acknowledges that control technologies, BMPs and other measures to reduce anthropogenic warming are evolving and that the implementation to meet these criteria will be an iterative process." (OAR Chapter 340, Division 41, pages 20-21.).

The DEQ rule states that unless superceded by the natural conditions criteria described in section (8) of this rule, or by subsequently adopted site-specific criteria approved by EPA, the temperature criteria for waters supporting salmonids are as follows (OAR Chapter 340, Division 41, page 21.):

> <u>Salmon and steelhead spawning areas:</u> 7-day-average maximum may not exceed 55.4 degrees F.
>
> <u>Core cold water habitat</u>: 7-day-average maximum may not exceed 60.8 degrees F.

<u>Salmon and trout rearing and migration</u>: 7-day-average maximum may not exceed 64.4 degrees F.

Fires, storms, and human activities such as timber harvest and road construction have the potential to influence temperature by reducing shade producing riparian vegetation or by changing the shape of the channel. Several streams in the fire area are listed as water quality limited because of elevated summer stream temperature. All of the listed streams have had their stream temperature influenced, to some degree, by all of the factors listed above. Following the fire it is estimated that 33% of the riparian canopy in the N.F. Smith Watershed was killed by the fire. Temperature data is not available to determine the affects on stream temperature

Fish Habitat

Species/Stocks Presence and Distribution: On 5/6/97, the National Marine Fisheries Service listed coho salmon as Threatened under the Endangered Species Act. On 5/5/99, they designated critical habitat to include all stream reaches accessible to coho salmon except areas above specific dams or longstanding, naturally impassible barriers. Currently the Forest and NOAA Fisheries have agreed to use the StreamNet database (www.streamnet.org) to define critical habitat for coho salmon and Essential Fish Habitat (EFH) for coho and Chinook salmon. This database models coho salmon distribution based on either documented occurrence records or stream gradient and, therefore, may predict occurrence in streams that are not used by coho salmon even at times of population abundance.

Stream shade: The Biscuit Fire of 2002 burned through portions of the Baldface Creek, Upper North Fork Smith River, Diamond Creek, and the Peridotite Canyon subwatersheds and reduced stream shade along many stream reaches.

Large wood: Many riparian trees were killed by the Biscuit Fire and will become future sources of large wood to small tributary stream channels.

Future Trends

Geology/Soils

Most inner gorge failures appear to have active sloughing, which is probably an on-going process regardless of the effects of fire. More stabilized features with good vegetation cover are at higher risk of reactivation with the loss of root strength and surface protection. Higher subsurface saturation and higher stream flows following the loss of vegetation to the fire may accelerate the rate of movement of inner gorge failures or other features that toe out in the stream as channel incision and streambank failures are further destabilized from stream undercutting.

A higher rate of surface (soil) erosion will occur until vegetation is reestablished, at least in the form of shrubs and grass, in approximately 5 years. Slopes in areas underlain by ultramafic rocks will revegetate more slowly, given the ravelly and droughty nature of those soils. Needle cast and woody litter will locally decrease the rate of surface erosion. Increased channel incision and streambank instability will continue until the stream reaches bedrock and/or riparian vegetation is reestablished, 5 to 15 years. Riparian planting will help locally to shorten recovery time.

Roads, especially 4x4 wheel drive roads, that are not stabilized or reconstructed for drainage control will continue to revegetate and/or fail until natural drainage and slope configuration is reestablished. Small failures from road runoff were noted in Diamond Creek.

Fish Habitat

Stream shade: Stream shade will increase over time and, barring another fire, recover to pre-fire levels. The rate of recovery depends upon the site potential to grow shade producing plants and the stream width, as wider stream reaches require taller (older) trees for shade recovery.

Large wood and sediment: Large wood and sediment recruitment to stream channels tends to be episodic in nature. The amount, timing, and rate of large wood recruitment to stream channels are determined primarily by the disturbance interval. Streams affected by the Biscuit Fire will be receive relatively high inputs of large wood and sediment as dead and dying tress are recruited to stream channels through natural processes including slump failures and landslides. The rate of large wood recruitment is expected to be high initially and to gradually increase over the first six to seven years. It is at this point that tree root failure of killed trees is highest. Consequently, it coincides with the highest rate of slump failures and landslides. After this period, the rate of large wood and sediment recruitment is expected to slowly decrease over the next ten years to approximately pre-fire levels; followed by several decades, depending upon the disturbance interval, of lower than pre-fire levels.

Management Opportunities

- Expand aerial photo mapping for landslide monitoring to encompass the Kalmiopsis Wilderness
- Stabilize roads of concern identified in the previous Watershed Analysis, the Biscuit Assessment, or as listed above
- Ensure restoration of firelines, especially those constructed on serpentine soils. If firelines are designated for use by fire suppression or recreation, ensure they are stabilized and/or reconstructed to minimize concentrating runoff, rutting, and gully erosion
- Reforestation and/or seeding with native grasses in areas of vegetation change 3 and 4 outside of the Wilderness Area
- Consider reforestation to oak/pine savanna in draughty soils underlain by ultramafic rocks
- Plant conifers along burned perennial stream reaches to improve future stream shade and large wood recruitment and retention. Give priority to areas with the following characteristics: relatively wide stream channels; good conifer site potential; south (shade producing) side of channel; total or nearly total conifer mortality; and at least 0.5 acre in size.

References

North Fork of the Smith River Watershed Analysis, 1995, Iteration 1.0, USDA FS, Siskiyou National Forest

Biscuit Post-Fire Assessment, 2003, Rogue River and Siskiyou National Forests

Draft Environmental Impact Statement, The Biscuit Fire Recovery Project, 2003. Rogue River and Siskiyou National Forests

Aerial Photo Review of 8/2003 1:40,000

Field reviews

USDA Forest Service, Siskiyou National Forest. Fisheries Report for the Biscuit Fire Recovery Project DEIS. 10/15/03

USDA Forest Service, Siskiyou National Forest. Biscuit Fire Assessment

USDA Forest Service, Siskiyou National Forest. Biological Assessment of Fire Suppression and Rehabilitation Activities. 11/12/02

USDA Forest Service, Siskiyou National Forest. Burned Area Emergency Rehabilitation

Wildlife

Introduction

72 % of this watershed was affected by the Biscuit Fire. The Biscuit Post-fire Assessment (USDA 2003) and Biscuit Recovery EIS (USDA USDI 2003 and 2004) identified wildlife habitats that need protected and restored in the Biscuit Fire area in order to meet the Forest Service's desired conditions for wildlife; these needs are also relevant outside of the Biscuit Fire area. These habitats of concern are late-successional forest and the grass/forb element of savannas, forest under-stories, and meadows.

Late-successional forest habitats of concern include spotted owl nesting/roosting habitat and pine/deciduous oak woodland or savanna. Late-successional spotted owl nesting/roosting habitat is defined as dominated by trees > 21" dbh with moderate to high canopy cover, > 40 %, (Zabel et al. 2003). This nesting/roosting habitat includes mature (21-32" dbh) and old growth (>32" dbh) forest with canopy cover greater than 40%. Late-successional pine/deciduous oak habitat is defined as dominated by pine and deciduous oak trees > 21" dbh with low to moderate canopy cover with brush and grass/forb ground cover.

Fire and vegetation management affect these habitats of concern. The greatest potential for impacts to habitats of concern from fire is within fire regimes I and IIIA, and the greatest potential for impacts from vegetation management are from regeneration harvest or thinning.

The exclusion of low intensity fire and timber management practices has adversely affected habitats of concern in this watershed. Exclusion of low intensity fire reduced the amount of grass/forb habitats, because this allowed encroachment to increase forest canopy cover, which eliminates most grass/forb ground cover. In addition, exclusion of low intensity fire contributed to the massive mortality of forest habitats during the high-intensity burning of the Biscuit Fire; more late-successional forest was killed in fire regimes I and IIIA than in other, more mesic, fire regimes. Suppression of low intensity fire has increased the risk of losing late successional habitat to high intensity fire, and restoration of low intensity fire could reduce this potential, especially within fire regimes I and IIIA.

The effects from vegetation management to these habitats of concern are dependant upon treatment prescriptions. Treatments that help protect and restore habitats of concern are recommended, such as low intensity fire, while treatments that degrade or remove these habitats, such as harvest of large trees, are discouraged from a wildlife perspective.

Site Productivity

Late successional spotted owl habitat does not generally develop on serpentine sites with low or moderate productivity. This watershed contains about 31,500 acres of low or moderate productivity serpentine sites, which is 31 % of 100,900 acres in the watershed.

Fire Regime

Fire regime data is available at this time for the portion in Oregon, which is 46 % of this watershed. 73 % of the area with data is in fire regimes I or IIIA and 27 % in Fire Regime IIIB. This ratio is probably consistent across the entire watershed, because the remaining areas are similar to those with data.

Changes in Current Conditions

Late-successional spotted owl habitat

The Biscuit Fire destroyed 30 % of mature and 19 % of the old growth spotted owl nesting/roosting habitat that existed before the fire in this watershed.

Currently, this watershed has 11 % mature and 8 % old growth on sites capable of developing late-successional spotted owl habitat. This amount of old growth is well below desired/historic levels.

Grass/forb habitats

The Biscuit Fire should have benefited grass/forb habitats where seed sources were present before the fire and where suppression rehab efforts included seeding.

Future Trends

Forests will continue to be at risk from stand replacement fires, with areas in fire regime's I and IIIA having the highest risk. Suppression of low intensity fires will continue, which will result in continued encroachment of woody plants into deciduous oak savannas, meadows, and late-successional forest under-stories.

Management Opportunities

Restoration of low intensity fires where they were historically common could help protect and restore habitats of concern within this watershed. Shaded fuel breaks or Fuels Management Zones (FMZs) could facilitate the restoration of low intensity fires, because they would provide relatively safe and defensible locations for managing fires at the landscape scale.

Previous ecosystem analyses at the watershed scale identified other relevant management opportunities; however, within fire regimes I and IIIA, there is probably no treatment more important than development and maintenance of FMZs, because these are needed in order to restore low intensity fire that helps protect and restore habitats of concern.

References

1. Zabel, Cynthia J.; Jeffery R. Dunk, Howard B. Stauffer, Lynn M. Roberts, Barry S. Mulder, and Adrienne Wright. 2003. Northern spotted owl habitat models for research and management application in California (USA). Ecological Applications. 13(4), 2003, pp. 1027-1040. Agee, J.K. 1993. Fire ecology of Pacific Northwest forests. Washington, D.C.: Island Press; 493 p.
2. USDA 2003. Biscuit Post Fire Assessment. Rogue River/Siskiyou National Forests.
3. USDA USDI 2003 and 2004. Rogue River/Siskiyou National Forest and Medford District BLM. Biscuit Recovery EIS: Draft and Final.

Vegetation - Silviculture

Changes in Current Conditions

In the summer of 2002, the Biscuit Fire burned 48,641 acres or 99% of the Watershed. The fire burned in a wide range of intensities and exhibited varying behavior. The effect on the forest vegetation is just as varied, ranging from nearly complete consumption of vegetation and woody material to light underburning with little effect on the dominant trees, creating a mosaic of dead and live vegetation. As noted in the Biscuit Fire Recovery Project DEIS, satellite imagery was used to create 4 classes of fire effects.

The codes in the Vegetation Change classification system are as follows:
1 = little or no change (majority of vegetation is alive, primarily low intensity under-burn);
2 = low change (majority of the vegetation is dead but some live trees remain; dead trees retain needles and leaves; primarily moderate to high intensity underburn);
3 = moderate change (all vegetation is dead but needles and leaves remain in the overstory; primarily from high intensity underburn);
4 = high change (trees are dead with few or no needles or leaves; primarily from crown fires).

The acreage results are displayed below:

Table 1, Vegetation Change for the Watershed

		Canopy Mortality Categories				
		1 (Little or no change)	2 (Low)	3 (Moderate)	4 (High)	Fire Totals
Total Acres	101,098	7611	14,012	19,802	8606	50,031
Percent of Area for Each Category		15	28	40	17	100

The current condition of trees in the Biscuit Recovery Area contrasts starkly with the desired future condition projected in the Siskiyou National Forest Plan. The Forest Plan envisioned stands of late successional forest and plantations stocked with valuable conifers. The current reality in the Biscuit area is expanses of dead trees and sprouting brush, interspersed with under burned stands. Stands of varying age classes in commercial timber producing areas were set back to the earliest of age classes. Trees that shaded streams where salmonids thrive in the cool water are dead.

Areas of high severity burn are often far from conifer seed sources and within areas where significant hardwood and brush competition is expected. Natural regeneration of conifers is expected to require decades. Resprouting hardwood and brush are expected to dominate these sites for at least that period of time.

Some of the drier sites that were severely burned clearly manifest the consequences of over 50 years of effective fire exclusion. These south and west aspects were generally open stands of large pine with some deciduous oak and little understory except grasses and forbs and occasional brush and small trees. In the past, these sites were maintained by a frequent, low intensity fire regime. By the time of the Biscuit Fire they had become choked with dense small trees and brush as a result of fire exclusion.

Future Trends

Following the Fire, hardwood vegetation will sprout very rapidly in the tanoak PAGs. The growing space for conifers, that will seed in naturally or be planted, will be taken over by the aggressive sprouts. Many of the conifer trees that do become established, will grow very slowly or die due to lack of sunlight, moisture, or both. In the other PAGs, sprouting of hardwood vegetation is not expected to be as aggressive, and the natural and planted seedlings will have less competition.

Management Opportunities

Many areas that burned with high severity supported stands of Port Orford-cedar, sugar pine, and western white pine, which were reduced by introduced diseases prior to the fire. Natural regeneration of these species is expected to be extremely low and without the planting of resistant stock their abundance may be significantly reduced over time.

Opportunities exist for salvage of dead trees for the next two to three years. After that, the wood will deteriorate and loose its value. Wood that is retained on site, will benefit the habitat of many species, if it does not burn in subsequent fires. In order to have large conifer trees in the future, planting and subsequent tending of the salvage sale plantations, existing plantations, riparian areas, oak-pine sites, and other planting will be necessary in many areas. Planting of disease resistant Port-Orford-cedar and sugar pine will be necessary in order to keep these two valuable species in the watershed.

References

USDA Forest Service, Siskiyou National Forest. Biscuit Fire Assessment, 2003.
USDA Forest Service, Siskiyou National Forest. The Biscuit Fire Recovery Project, Draft Environmental Impact Statement, 2004.
Silvics of North America, Western white pine, p 385, Vol. 1-Conifers, Sugar Pine, p 375, and Port-Orford-cedar, p 94.

Insect Considerations

Changes in Current Conditions

Prior to occurrence of the Biscuit Fire, forest insects were not considered to constitute a significant concern in this watershed. The fire has changed this by killing or injuring substantial numbers of trees and predisposing them to possible insect attack.

Future Trends

It is likely that insects will colonize fire-killed trees and infest and kill fire-injured trees within the burned areas in this watershed in the next few years. It is well documented that both bark beetles (family Scolytidae) and woodborers (families Cerambicidae, Buprestidae, Scolytidae, and Siricidae) readily infest trees injured but not killed outright by fire and that many species of woodborers infest fire-killed trees (Miller and Keen 1960, Furniss 1965, Furniss and Carolin 1977, Thomas and Agee 1986, Ryan 1990, Swezy and Agee 1990, Ryan and Frandsen 1991, Harrington and Sackett 1992, Flanagan 1996, Scott et al. 1996). In fact: a) most of the fire-injured trees that die in a burned area within the 5 years following a forest fire are infested by bark beetles, woodborers, or representatives of both groups concurrently, and b) insects along with decay fungi that they vector play significant roles in the deterioration of most fire killed trees.

A number of systems have been devised for risk rating the still-living trees in a burned area immediately after a fire and predicting which are most likely to succumb to subsequent bark beetle and woodborer infestation (Wagner 1961, Reinhart and Ryan 1988, Flanagan 1996, Southwest Oregon Forest Insect and Disease Service Center 2001, Scott et al 2002,). Use of the rating system devised by the Southwest Oregon Forest Insect and Disease Service Center on a sample of plots within the perimeter of the Biscuit Fire suggests that 40 percent of the fire-injured but still-living trees there are at high risk of bark beetle or woodborer infestation. This is also probably a reasonable estimate of the proportion of fire-injured trees in this watershed that are at high risk of infestation. In addition, there is a possibility that insect populations will build up sufficiently when fire-injured trees are infested to attack nearby uninjured trees.

Management Opportunities

1) Trees killed outright by the fire could be removed before insects and decay fungi cause substantial deterioration. The sooner such trees are removed the less the likelihood of substantial amounts of deterioration. Rate of likely deterioration can be used in prioritizing treatments. Deterioration due to insects and associated fungi develops most quickly in smaller trees and thin-barked species though, given enough time, all fire-killed trees are eventually affected. Decisions on whether or not to salvage fire-killed trees should be made in the context of overall management objectives.
2) Fire injured but still living trees could be evaluated using a risk rating system, and high risk trees in strategic locations could be considered for treatment. Alternatively, fire injured trees could be monitored, and if significant numbers are infested, those in strategic locations could be considered for treatment. Treatment of high risk or insect

infested trees would involve cutting and removal. If trees are removed quickly enough, this will reduce likelihood of insect spread to other trees. Decisions on whether or not to treat high-risk or recently-insect-infested trees should also be made in the context of overall management objectives.

References

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Guidelines for estimating the survival of fire-damaged trees in California. USDA Forest Service, Pacific Southwest Forest and Range Experiment Station. Miscellaneous Paper 60. 11p.

Transportation

Changes in Current Conditions

The information provided in this update is generated from the Geographical Information System (GIS). This database provides spatial analytical information. Because this mileage is two-dimensional the actual field mileage will vary because of the terrain.

Forest Service policy is to maintain classified roads to their Road Maintenance Level as prescribed by the road management objective. The maintenance level defines the level of service provided by, and maintenance required for, a specific road, consistent with road management objectives and maintenance criteria. (FSH 7709.58, Sec 12.3 – Transportation System Maintenance Handbook)

Maintenance Level 1: Assigned to intermittent service roads during the time they are closed to vehicular traffic. The closure period must exceed 1 year. Basic custodial maintenance is performed to keep damage to adjacent resource to an acceptable level and to perpetuate the road to facilitate future management activities. Emphasis is normally given to maintaining drainage facilities and runoff patterns. Planned road deterioration may occur at this level. Appropriate traffic management strategies are "prohibit" and "eliminate". Roads receiving level 1 maintenance may be of any type, class or construction standard, and may be managed at any other maintenance level during the time they are open for traffic. However, while being maintained at level 1, they are closed to vehicular traffic, but may be open and suitable for non-motorized uses.

Maintenance Level 2: Assigned to roads open for use by high clearance vehicles. Passenger car traffic is not a consideration. Traffic is normally minor, usually consisting of one or a combination of administrative, permitted, dispersed recreation, or other specialized uses. Log haul may occur at this level. Appropriate traffic management strategies are either (1) discourage or prohibit passenger cars or (2) accept or discourage high clearance vehicles.

Maintenance Level 3: Assigned to roads open and maintained for travel by a prudent driver in a standard passenger car. User comfort and convenience are not considered priorities. Roads in this maintenance level are typically low speed, single lane with turnouts and spot surfacing. Some roads may be fully surfaced with either native or processed material. Appropriate traffic management strategies are either "encourage" or "accept." "Discourage" or "prohibit" strategies may be employed for certain classes of vehicles or users.

Maintenance Level 4: Assigned to roads that provide a moderate degree of user comfort and convenience at moderate travel speeds. Most roads are double lane and aggregate surfaced. However, some roads may be single lane. Some roads may be paved and/or dust abated. The most appropriate traffic management strategy is "encourage." However, the "prohibit" strategy may apply to specific classes of vehicles or users at certain times.

Maintenance Level 5: Assigned to roads that provide a high degree of user comfort and convenience. Normally, roads are double-lane, paved facilities. Some may be aggregate surfaced and dust abated. The appropriate traffic management strategy is "encourage."

In the Road Inventory there are currently:

- Maintenance Level 1 = 0.27 miles
- Maintenance Level 2 = 58.81 miles
- Maintenance Level 3 = 3.12 miles

The closed and decommissioned roads are listed below.

1 - BASIC CUSTODIAL CARE (CLOSED)		4402560	0.27
1 - BASIC CUSTODIAL CARE (CLOSED) Total			0.27

DE - DECOMMISSIONED		4402167	0.24
		4402475	0.03
		4402480	0.00
DE - DECOMMISSIONED Total			0.28

Due to the Biscuit fire and resulting lack of vegetation there is the potential for increased rain runoff in the Recovery Area. This runoff can cause erosion, gullies, and debris flows that could jeopardize roads, culverts, and bridges. Concentrated water and debris flow increases the risk of saturating and undermining road fill slopes, which can either slump or slide, narrow the road width, and cause increase in stream sediment. When a live stream culvert plugs, the water can wash out the road and divert the stream flow from the natural stream channel. Water diversions caused by plugged culverts can cause significant erosion damage and sediment delivery from both stream crossings and cross drainages, which continue to plug other culverts as they cascade down the road, creating deeper and wider erosion gullies.

Stream culverts are generally undersized to meet the 100-year storm event as per the Aquatic Conservation Strategy. These culverts are site specific. The transport of Port-Orford-cedar root disease is an additional concern when water tops roads.

During the initial (BAER) effort, both the Forest Service and BLM found many blocked culverts and slopes susceptible to mass erosion. Even though the fire was extensive, approximately 500,000 acres, this initial effort provided some partial road stabilization treatments on approximately 70 roads. These road treatments offered some initial runoff and storm relief for the first winter rains at those specific site locations. These road treatments were sporadic, and consisted of rolling dips over drainages; installing cross ditch drainages; outsloping road sections; surface rock replacement; road maintenance activities such as ditch and culvert cleaning; culvert replacements; and slope reinforcement.

These stabilization treatments were successful in helping minimize the potential for road failures, and to decrease the accelerated sediment delivery to fish habitat and to downstream watersheds. However, after the first winter, there were washouts on roads; some of these were in controlled locations where stabilization techniques diverted the water back into its stream channel rather than carrying accumulating sediment down the road.

Culverts in high intensity burn areas are the most susceptible to fail. These culverts are susceptible to the greatest concentrations of debris flows and sedimentation. Culverts at risk that are also fish passage barriers are the highest concern because of the essential fish habitat.

Future Trends

Forest and project level Roads Analysis will help the land manager to determine the current and future access needs for roads. This analysis will aid in a land management decision to maintain the road, close, or decommission it, and hydrologically stabilize it if treatment is needed. The management objective is to manage the forest transportation system to provide user safety with efficiency of operations in an environmentally responsible manner, and to continue road-related ecosystem restoration within the limits of current and likely funding levels. There are a number of opportunities to be proactive for this management objective.

Road management objectives establish the specific intended purpose of an individual road based on land management area direction and access management objectives. These objectives guide how a road is to be located, designed, constructed, operated, and maintained to meet the specific resource management objectives for the area accessed by the road. The objectives are also the basis for the road inventory, signing and mapping, and rules and regulations that apply to the use of the road.

Stabilized roads function in a more natural fashion with the environment regardless of whether the road is kept open, closed or decommissioned. Road stabilization is a system of treatments on a road designed to protect water resources and slope stability, including water quality, fisheries, and soil productivity. This will result in a road being able to better withstand storm and run-off events. This includes controlling drainage and sediment from road surfaces to minimize drainage impacts on other resources. This should make a road less dependent on many of the recurrent drainage maintenance activities.

An example of a road treatment would be to install long-term rolling dips into the road prism. These rolling dips are easily drivable, but also function to disburse water and reduce water diversion potential if an existing culvert plugs. Most dips need to have an aggregate base surface to prevent erosion and rutting, and control the sediment fines from washing. Other treatments include outsloping road sections to evenly disburse water; installing fill stabilization techniques such as rip rap or gabion walls; revegetation of cut and fill slopes; drivable fords; cross drainages; culvert end sections; upsizing culverts to meet a 100 year storm event; removing culverts and recontouring channels to their original contours; reducing fills over culverts; adding aggregate surfacing to a road; and adding drop inlets, to mention a few.

In the past it was perceived that only decommissioning or closing a road could help ecosystem restoration; however, with access needs we can actively promote stabilization of open Forest Service roads as well. Each road is site specific as to what applications could be used. The road status will largely determine the type of treatments that will be used. After the stabilization process of an open road, the maintenance interval is reduced, and the road system functions in a more cost-effective manner. Decommissioning and stabilizing a road should have no more maintenance costs associated with it. Stabilizing and closing a road can be much like decommissioning it if the resource need is high. Currently, National Direction is to hydraulically stabilize all closed roads. Closing a road is usually more economical than decommissioning it, as culverts are not normally pulled out or channels recontoured. However, if the resource risk is very high a closed road may receive much of the same treatments as a decommissioned road by pulling culverts and recontouring stream channels. When a road is decommissioned it no longer exists on the system to be used in the future and is taken off the classified road inventory. Closing a road places it in a state of storage to use for future land management needs. A closed road remains on the system and is included in the inventory of system roads. The trend for the future is to continue to analyze and determine which roads to maintain, which roads to reduce the Maintenance Level on or which roads need the Maintenance Level increased, and which roads to close or decommission. The trend is to stabilize roads, as there are management opportunities and available funds to do so. Stabilization of a road may have the status as an open, closed, or decommissioned road. This proactive stance will support environmental restoration and economic sustainability.

Management Opportunities

Because of the Biscuit fire and the potential risk for plugged culverts, road washouts, and road fill failures the following stabilization of roads at risk is recommended from the Biscuit Area Roads Analysis process. There are 28.5 miles of classified road located in the North Fork Smith River Watershed that are located within the Biscuit fire boundary area.

NORTH FORK SMITH RIVER Watershed

Roads to be Stabilized

HUC-5	HUC-6	Road No.	Length (Miles)
NORTH FORK SMITH RIVER	ROUGH AND READY CREEK	4402488	0.08
	BALDFACE CREEK Total		0.08
WEST FORK ILLINOIS RIVER Stabilized Total Miles			0.08

There are no roads to be Closed in the NF Smith River Watershed.

Roads to be Decommissioned

HUC-5	HUC-6	Road No.	Length (Miles)
NORTH FORK SMITH RIVER	BALDFACE CREEK	4402530	0.30
		4402560	0.01
	BALDFACE CREEK Total		0.30
	DIAMOND CREEK	4402560	0.27
	DIAMOND CREEK Total		0.27
NORTH FORK SMITH RIVER Decommissioned Total Miles			0.57

Total miles of roads to have treatment in North Fork Smith Watershed 0.65

References:

Biscuit Fire Area Roads Analysis, April 2004, USDA Forest Service, Pacific Northwest Region, Rogue-Siskiyou National Forest, Ian Bayliss

Port-Orford-Cedar (POC)

Changes in Current Conditions

Data gap. POC locations within the Biscuit fire perimeter are unknown. Until a new POC inventory is completed, all project sites will require an on site visit to determine presence or absence of POC and/or *Phytophthora lateralis* (PL), the pathogen that causes POC root disease.

Future Trends

Data gap. An Inter-agency Supplemental Environmental Impact Statement (SEIS) for managing POC is being developed. The alternative selected in the Record of Decision for SEIS will determine future trends.

Management Opportunities

General

Management described below pertains to lands without wilderness designation. Actions within the Kalmiopsis wilderness shall be consistent with policy for management within wilderness areas.

Roads 1107-220, 4402, 4402-450 and 4402-112 are candidates for sanitation.

Determine presence of PL along roads 4402 and 4402-206. If the pathogen is present, those areas with root disease are candidates for eradication.

Environmental analysis for any projects in areas with POC (includes access and egress routes) will include a PL control strategy.

Project design criteria for work in POC areas must include a determination of whether or not the area has root disease. Uninfested areas will be treated prior to infested areas. Most work should be limited to the dry season. Exceptions can be made for prescribed fire or in emergency situations which will have to be decided on a site specific basis. This does not mean that no precautions should be taken. Only that working in the wet season may be necessary to meet prescribed fire or other management objectives. For wet season operations, unit scheduling (treat uninfested areas first, then infested areas), vehicle washing (before entering uninfested areas and before leaving infested areas), designation of access and egress routes or other measures should still implemented.

Add POC treatments to records for treated unit.

Bough Collection

Bough cutting has occurred along road 1107-220 in the past.

Bough harvest should only be permitted when bough collection is accomplished via permit (negotiated contracts or by bid), requiring dry season operations (June through September), designation of access and egress routes, designation of parking areas, unit scheduling (collect all uninfested areas prior to infested areas), washing of boots and equipment, daily inspections, and easily identifiable areas where boughs are to be collected. No other special forest products permits will be issued where Port-Orford-cedar is present unless administration described above can be implemented.

Engineering

Washing areas should be at entry/exit points of the road system with Federal control. Washing areas should be situated so that runoff does not enter stream channels, ditchlines, or areas with POC. Washing areas should be mapped and recorded in a GIS layer so that they can be used in the future. Each road system that accesses areas with POC should have at least one washing area designated. Vehicle washing should take place as close as possible to infested sites. Ideally, vehicles should not travel for any substantial distance prior to being washed. Vehicles moving into uninfested areas may be washed miles away as long as they do not travel through infested areas to reach their destination. An evaluation to test the effectiveness of a vehicle washing treatment was conducted by the Southwest Oregon Forest Insect and Disease Service Center (SWOFIDSC) in June, 1999 (Goheen et al. 2000). Results indicated that there were large reductions in inoculum on the vehicles following washing.

Map water sources to show presence or absence of PL. Utilize uninfested water sources for planned activities such as road watering and other water distribution needs, or treat water with Clorox (Ultra, Institutional, as per label) to prevent the spread of PL.

As part of roads analysis, determine if areas with POC still require road access.

Road locations should be made, when possible, below POC areas or on opposite sides of ridges.

Where POC is concentrated within stream courses, road drainage should be designed to disperse water away from streams.

Locate and design waste areas so they do not spread PL spores. Use only approved waste areas if material must be transported.

Limit road construction and maintenance to the dry season (June through September). Minimize operations during periods of heavy rain regardless of time of season. However, this will not prevent the opening of plugged culverts or ditches or other maintenance when the need arises during periods of heavy rain.

Access to the project area should be along routes with least occurrence of infection sites.

Eradication

Use eradication and prescribed fire as management tools in areas with PL. Eradication is the killing of live POC in areas that have PL. Eradication distances will be a function of the crown radius of the infected tree. All healthy looking POC within three crown radii from the last infested tree will be killed. Removal of the tree is not required but may be necessary to allow for prescribed fire application. POC treatment areas should be treated as soon as possible after regenerating POC reach a height of 6 inches above ground level. This treatment should be incorporated into routine management such as roadside brushing, young stand management treatments, and pre-commercial thinning.